RESEARCH PROJECT SEGMENT

State: Alaska

Project No.: F-9-4 *Name:* Sport Fish Investigations of Alaska.

Study No.: G-II *Study Title:* Sport Fish Studies.

Job No.: G-II-E *Job Title:* Studies of Trophy Game Fishes in Kvichak and Alagnak (Branch) Drainage of Bristol Bay.

Period Covered: July 1, 1971 to June 30, 1972.

ABSTRACT

A temporary weir was constructed on the west fork of Lower Talarik Creek to monitor the spawning migration and aid in collecting biological data from rainbow trout, Salmo gairdneri, and Arctic grayling, Thymallus arcticus. Hooking mortality studies, spawning ground surveys, and an open departure angle survey were conducted at Lower Talarik Creek.

Catch and effort data were collected from June 6 to October 17 at Lower Talarik Creek from 301 fishermen. Age, growth, and distribution patterns were determined. An economic survey was conducted at Lower Talarik Creek indicating an estimated $125,755.96 expended. The cost per rainbow trout caught at Lower Talarik Creek was $51.67 and for rainbow trout retained, $272.20.

The Gibraltar River drainage was surveyed from September 30 to October 6. Rainbow trout samples were collected from Dream Creek, Southeast Creek, and Gibraltar River for age and growth determination.

RECOMMENDATIONS

1. Continue the rainbow trout study as a trophy game fish in Kvichak and Alagnak (Branch) River drainages.

2. Expand the Lower Talarik Creek program by constructing a permanent weir to determine life history, migration patterns, and growth rates.

3. Continue to collect creel census information for harvest estimates, catch and release ratios, and total man-hours expended at Lower Talarik Creek and Copper River.

4. Continue to conduct surveys on Lake Iliamna to evaluate streams that support rainbow trout.

OBJECTIVES

1. To initiate a study relating to the management of designated trophy fish areas in Bristol Bay, with emphasis on Lower Talarik Creek.

    a. To determine the effectiveness of existing sport fish regulations in maintaining adequate levels of trophy fish stocks, including:

        (1) Retention-and-release ratios of rainbow trout in Lower Talarik Creek

        (2) Hooking mortalities of released rainbow trout in Lower Talarik Creek

    b. To determine angler acceptance of existing regulations in designated trophy fish watersheds.

2. To determine population numbers, age, length, sex composition, migrational timing, spawning, and additional life history information of Lower Talarik Creek rainbow trout. Spawning populations of rainbow trout will be determined in additional streams within the trophy fish area.

3. To obtain annual estimates of angler participation and harvest levels in trophy fish management areas.

4. To evaluate biological data reported in similar studies of managed trophy fish populations.

5. To provide recommendations for management of trophy fish populations.

TECHNIQUES USED

Fish capturing and sampling was conducted by the use of weir traps, hook and line, and electroshocking.

Anglers were interviewed for creel and economic information.

All fish captured were anesthetized with MS-222 (tricaine methanesulfonate) and measured for length. Standard fish lengths were recorded in the field to the nearest millimeter (mm) with rigid portable measuring boards.

Rainbow trout over 150 mm were sampled for length, sex, scales, spawning condition, and tagged. Every twentieth upstream and downstream migrant was sampled for otoliths, ovaries (testes), stomach contents, weight and parasites.

Tube-type anchor tags were applied with Floy (Dennison) FD-67 tagging guns.

Rainbow trout retained for hooking mortality studies were captured with "Mepps" single hook lures and were held in observation pens which were blocked off side tributaries of Lower Talarik Creek.

FINDINGS

Lower Talarik Creek

Temporary Weir Operations:

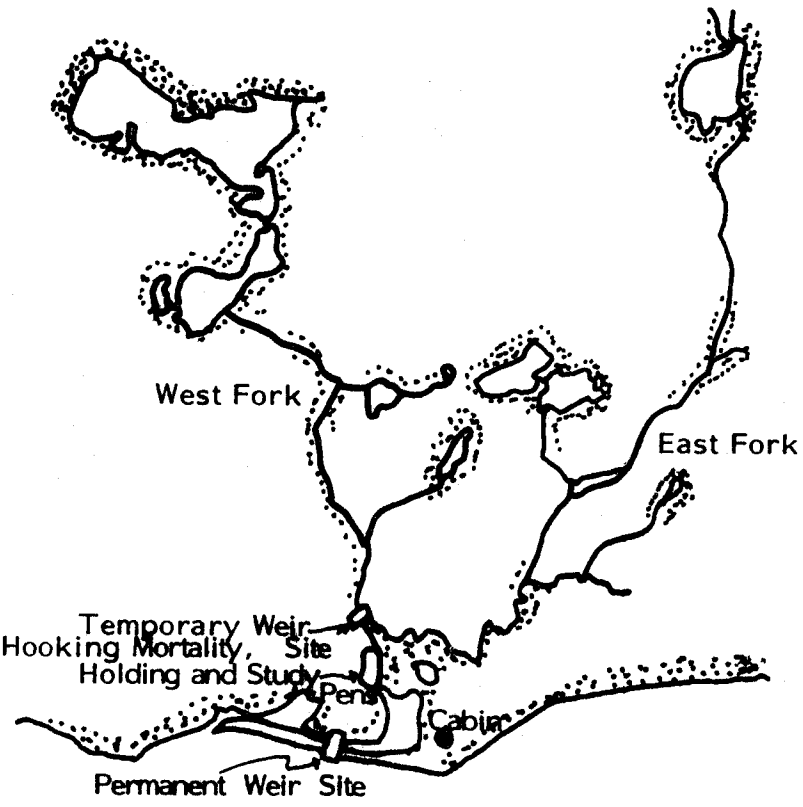
Rainbow Trout:

A temporary weir site was selected on the west fork of Lower Talarik Creek to monitor the passage of spawning rainbow trout, Salmo gairdneri (Figure 1). Weir construction began May 19 and was completed May 24. The weir was of metal fence post and 5/8-inch hardware cloth construction, with an upstream fyke trap and downstream "Wulf" trap.

The first upstream migrant rainbow trout was captured on May 26. Thirty downstream and 157 upstream migrant rainbow trout were enumerated, with 158 rainbow trout tagged before dismantling the weir on June 15.

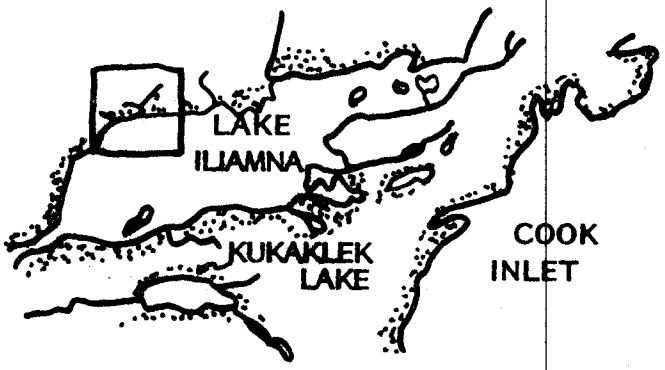
Eleven previously tagged rainbow trout were recovered at the weir; all but one were tagged during the late summer and fall at Lower Talarik Creek in 1970. One tag recovery was from a rainbow trout tagged at the weir as an upstream migrant and recovered again as an upstream migrant. This was due to a water channel around the weir that existed under the ice and was evidently large enough to allow fish passage. The extent of migration through this channel is unknown.

The upstream and downstream migrant rainbow trout length frequency is presented in Table 1. Of the 187 rainbow trout enumerated, 130 were in



TROPHY RAINBOW TROUT RESEARCH SITE AT LOWER TALARIK CREEK

State of Alaska showing Trophy Fish Area



Trophy Fish Area showing rainbow trout research site at Lower Talarik Creek

FIGURE 1 TROPHY RAINBOW TROUT AREA AND RESEARCH SITE AT LOWER TALARIK CREEK, 1971.

spawning condition, i.e., pre-spawner, active spawner, or post-spawner. The average length of female spawning rainbow trout was larger than the male, although the largest spawning rainbow trout were males (Table 2).

TABLE I Length Frequency of Upstream and Downstream Migrant Rainbow Trout, Lower Talarik Creek Weir, May 26 - June 15, 1971.

Length (mm)	Rainbow Trout		Tot.
	Upstream	Downstream	
75 - 99	-	3	3
100 - 124	-	1	1
125 - 149	1	3	4
150 - 174	2	4	6
175 - 199	2	2	4
200 - 224	3	4	7
225 - 249	2	-	2
250 - 274	4	2	6
275 - 299	8	1	9
300 - 324	5	-	5
325 - 349	3	-	3
350 - 374	2	-	2
375 - 399	3	-	3
400 - 424	1	2	3
425 - 449	6	1	7
450 - 474	4	1	5
475 - 499	1	-	1
500 - 524	6	-	6
525 - 549	3	-	3
550 - 574	7	1	8
575 - 599	9	-	9
600 - 624	15	1	16
625 - 649	17	2	19
650 - 674	18	-	18
675 - 699	16	-	16
700 - 724	8	-	8
725 - 749	5	1	6
750 - 774	4	-	4
775 - 799	2	1	3
Total	157	30	187
Length Range (mm)	147-797	83-796	83-797
Avg. Length (mm)	546	306	508

TABLE 2 Length Frequency by Sex of Spawning Rainbow Trout, Lower Talarik Creek Weir, May 26 - June 15, 1971.

Length (mm)	Males	Females	Tot.
200 - 224	3	-	3
225 - 249	-	-	-
250 - 274	-	-	-
275 - 299	3	-	3
300 - 324	2	-	2
325 - 349	2	-	2
350 - 374	-	-	-
375 - 399	2	1	3
400 - 424	1	-	1
425 - 449	1	1	2
450 - 474	3	2	5
475 - 499	-	1	1
500 - 524	1	4	5
525 - 549	-	3	3
550 - 574	1	6	7
575 - 599	3	6	9
600 - 624	1	14	15
625 - 649	1	17	18
650 - 674	8	9	17
675 - 699	4	12	16
700 - 724	6	2	8
725 - 749	5	-	5
750 - 774	3	1	4
775 - 799	3	-	3
Total	51	79	130
Length Range (mm)	211-797	385-752	211-797
Avg. Length (mm)	587	613	603

Spawning male rainbow trout ranged in length from 211 - 797 mm, while no spawning females were noted less than 382 mm. The spawning male-to-female sex ratio was 0.7:1.

Scales were collected from 179 rainbow trout over 150 mm in length. Of these, 128 scales were legible for age determinations. The spawning rainbow trout age frequency by sex and age of maturity indicates that male rainbow trout at Lower Talarik Creek reach spawning maturity at age IV, whereas the females reach spawning maturity at age VI (Table 3). Of the 42 male spawning rainbow trout, 30 (71.4%) were ages VIII - X, whereas 58 (96.7%) of the 60 females were ages VII - IX (Table 3).

TABLE 3 Age Frequency by Sex and Age of Maturity for Spawning Rainbow Trout, Lower Talarik Creek Weir, 1971.

Age	Male		Female		Immature		Tot.	
	No.	%	No.	%	No.	%	No.	%
IV	1	2.4	0	0.0	6	23.1	7	5.5
V	3	7.1	0	0.0	8	30.8	11	8.6
VI	4	9.5	1	1.7	9	34.6	14	10.9
VII	4	9.5	16	26.7	2	7.7	22	17.2
VIII	8	19.1	31	51.6	1	3.8	40	31.2
IX	17	40.5	11	18.3	0	0.0	28	21.9
X	5	11.9	1	1.7	0	0.0	6	4.7
Total	42	100.0	60	100.0	26	100.0	128	100.0

*Both male and female rainbow trout.

Length-age frequency of the spawning rainbow trout at Lower Talarik Creek is presented in Table 4. By inspection, the average growth increment of spawning rainbow trout at Lower Talarik Creek closely approximates a sigmoid growth curve.

TABLE 4 Length-Age Frequency of Spawning Rainbow Trout, Lower Talarik Creek Weir, 1971.

Length (mm)	Age Class IV	V	VI	VII	VIII	IX	X	Tot.
150 - 174	2	-	-	-	-	-	-	2
175 - 199	3	-	-	-	-	-	-	3
200 - 224	3	1	-	-	-	-	-	4
225 - 249	-	1	-	-	-	-	-	1
250 - 274	2	3	-	-	-	-	-	5
275 - 299	-	5	-	-	-	-	-	5
300 - 324	-	1	1	-	-	-	-	2
325 - 349	-	-	2	-	-	-	-	2
350 - 374	-	-	1	-	-	-	-	1
375 - 379	-	-	-	1	-	-	-	1
400 - 424	-	-	1	1	-	-	-	2
425 - 449	-	-	4	1	-	-	-	5
450 - 474	-	-	1	1	-	-	-	2
475 - 499	-	-	1	-	-	-	-	1
500 - 524	-	-	-	1	1	-	-	2
525 - 549	-	-	-	1	1	-	-	2
550 - 574	-	-	-	2	5	-	1	8
575 - 599	-	-	-	2	4	-	-	6
600 - 624	-	-	-	3	7	-	-	10
625 - 649	-	-	-	7	5	2	-	14
650 - 674	-	-	-	2	5	5	-	12
675 - 699	-	-	-	-	8	4	-	12
700 - 724	-	-	-	-	2	6	1	9
725 - 749	-	-	-	-	-	4	-	4
750 - 774	-	-	-	-	-	3	1	4
775 - 799	-	-	-	-	-	1	2	3
Total	10	11	11	22	38	25	5	122
Length Range (mm)	161-253	212-319	319-455	398-661	519-716	641-797	599-796	161-797
Avg. Length (mm)	196	267	405	574	627	704	731	550
Growth Increment (mm)	71	138	169	53	77	27		

Arctic Grayling:

One hundred sixty-six Arctic grayling, Thymallus arcticus, were enumerated at the Lower Talarik Creek west fork weir from May 26 to June 15. Of the Arctic grayling enumerated, 132 were tagged and released. Twelve downstream migrants and 154 upstream migrants were noted (Table 5). The upstream migration of Arctic grayling coincided with the upstream migration of rainbow trout. The Arctic grayling were in pre-spawning or spawning condition.

TABLE 5 Length Frequency of Upstream and Downstream Migrant Arctic Grayling, Lower Talarik Creek Weir, May 26 - June 15, 1971.

Length (mm)	Upstream	Downstream	Tot.
100 - 124	-	1	1
125 - 149	-	1	1
150 - 174	4	4	8
175 - 199	6	2	8
200 - 224	1	1	2
225 - 249	7	-	7
250 - 274	22	3	25
275 - 299	41	-	41
300 - 324	35	-	35
325 - 349	24	-	24
350 - 374	8	-	8
375 - 399	4	-	4
400 - 424	2	-	2
Total	154	12	166
Length Range (mm)	163-401	102-274	102-401
Avg. Length (mm)	296	188	288

Tag Recoveries:

Eleven tagged rainbow trout were recovered at the temporary weir in the west fork of Lower Talarik Creek from May 27 to June 14. All but one were tagged during the late summer and fall in Lower Talarik Creek, 1970. All recaptured fish were mature spawners. These spring spawning rainbow trout apparently concentrate in Lower Talarik Creek during late summer and fall, overwinter in the trunk stream or Lake Iliamna, and then migrate to their spawning areas in the spring.

One rainbow trout tagged at Lower Talarik Creek during 1970 was recaptured in Lake Iliamna off the mouth of Gibraltar River (Figure 2). Two other rainbow trout, tagged at Lower Talarik Creek, were recovered at the outlet of Lake Iliamna.

Spawning Ground Survey:

Rainbow trout were aerially observed spawning in both the east and west forks of Lower Talarik Creek on May 14, 1971. Rainbow trout spawning ground foot surveys were conducted during May and early June in the west and east forks of Lower Talarik Creek, indicating 166 and 339 spawning fish, respectively. These spawning ground estimates were considered minimal due to high and turbid waters in the lower sections of the east fork and main trunk stream.

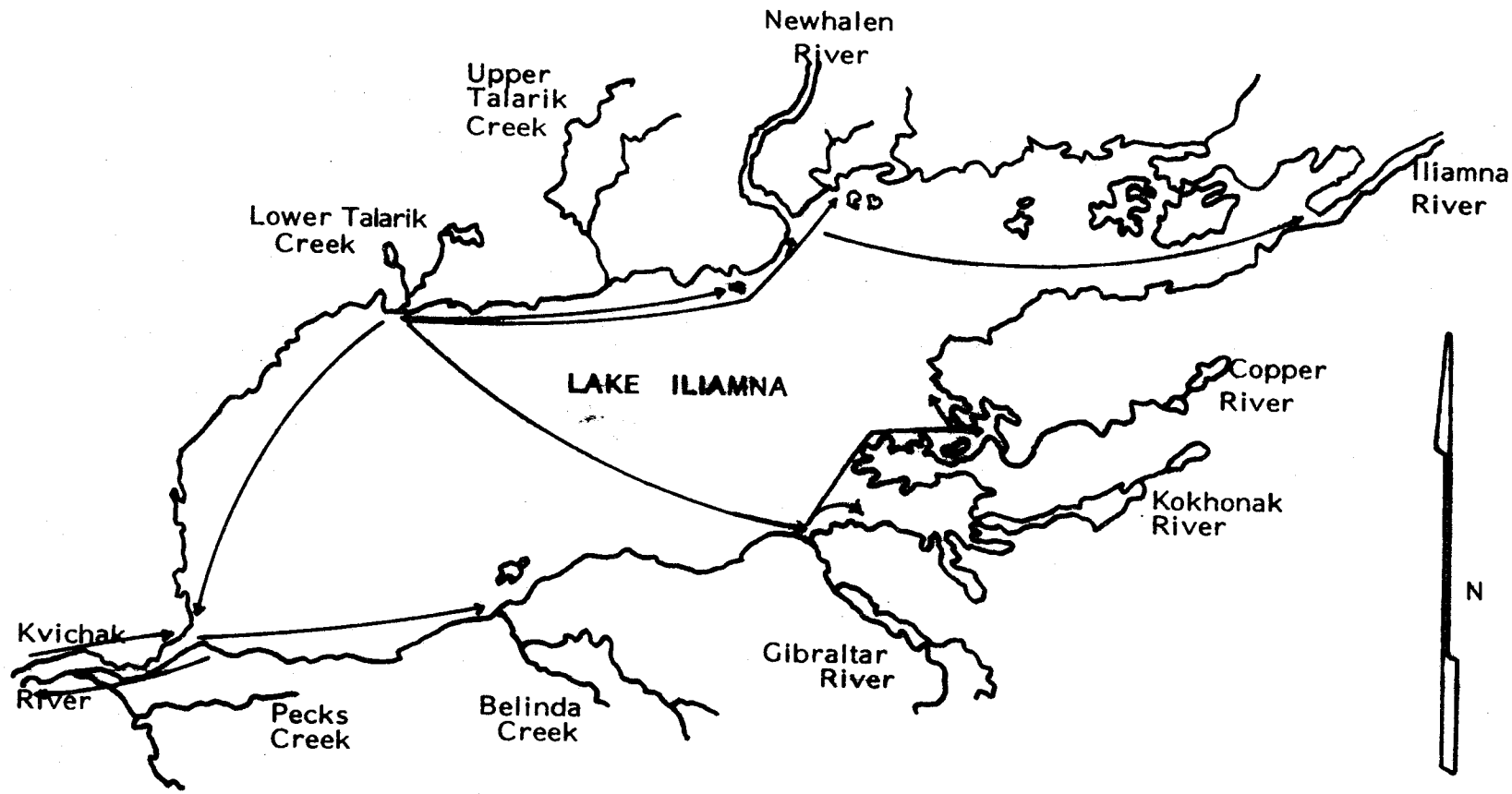


FIGURE 2 RAINBOW TROUT MIGRATORY PATTERNS IN LAKE ILIAMNA FROM TAG RECOVERY INFORMATION.

During the regular spawning closure, April 10 to June 7, both forks of Lower Talarik Creek were walked for observations of spawning areas and spawning progress. Since mature fish were still actively spawning during early June, the spawning closure was extended seven days by emergency order to protect these spawning stocks. The extended closure included Lower Talarik Creek, the Gibraltar River drainage, and the Kvichak River.

Transit Survey:

The west fork, east fork, and trunk system of Lower Talarik Creek were transit surveyed from June 20 to June 26. Open departure angles were noted and logged, as were all observable spawning areas and landmarks. Distances were computed from stadia rod readings. As the rainbow trout research program is expanded, spawning, rearing, holding areas, etc., will be plotted on a map derived from this survey to estimate seasonal patterns and use by rainbow trout.

The total survey traverse was computed to be 10.26 miles. Computed traverse length of the west fork, east fork, and trunk system was 2.85, 5.88, and 1.53 miles, respectively.

A permanent bench mark was established by Department personnel, exclusively for this survey.

Hooking Mortality Studies:

A sample of 30 rainbow trout was arbitrarily chosen for capture with each type of terminal fishing gear, within a two-day period. Gear used for the study were as follows: single hook with lure, single hook with eggs, single hook lure with eggs, and flies.

Imbedded hooks were removed from most fish with needle-nosed pliers. With deeply hooked fish, the leader was clipped and the hook left in the fish.

Upon removing the hook, the condition of the fish was noted, e.g., hooked in the gill arch and bleeding, hooked in the tongue, etc. Fish were transferred from the capture site to the holding pens in a portable floating pen (Figure 3).

Each group of rainbow trout was held in study pens and observed for 14 days. Study pens were blocked off sections of side channels which assumed near natural conditions of habitat, water temperature, and cover.

Fish were placed in appropriate pens denoting terminal gear used. After capture, the fish were observed by the following schedule: 1, 2, 4, 8, 24, 36, and 48 hours, and every 24 hours thereafter.

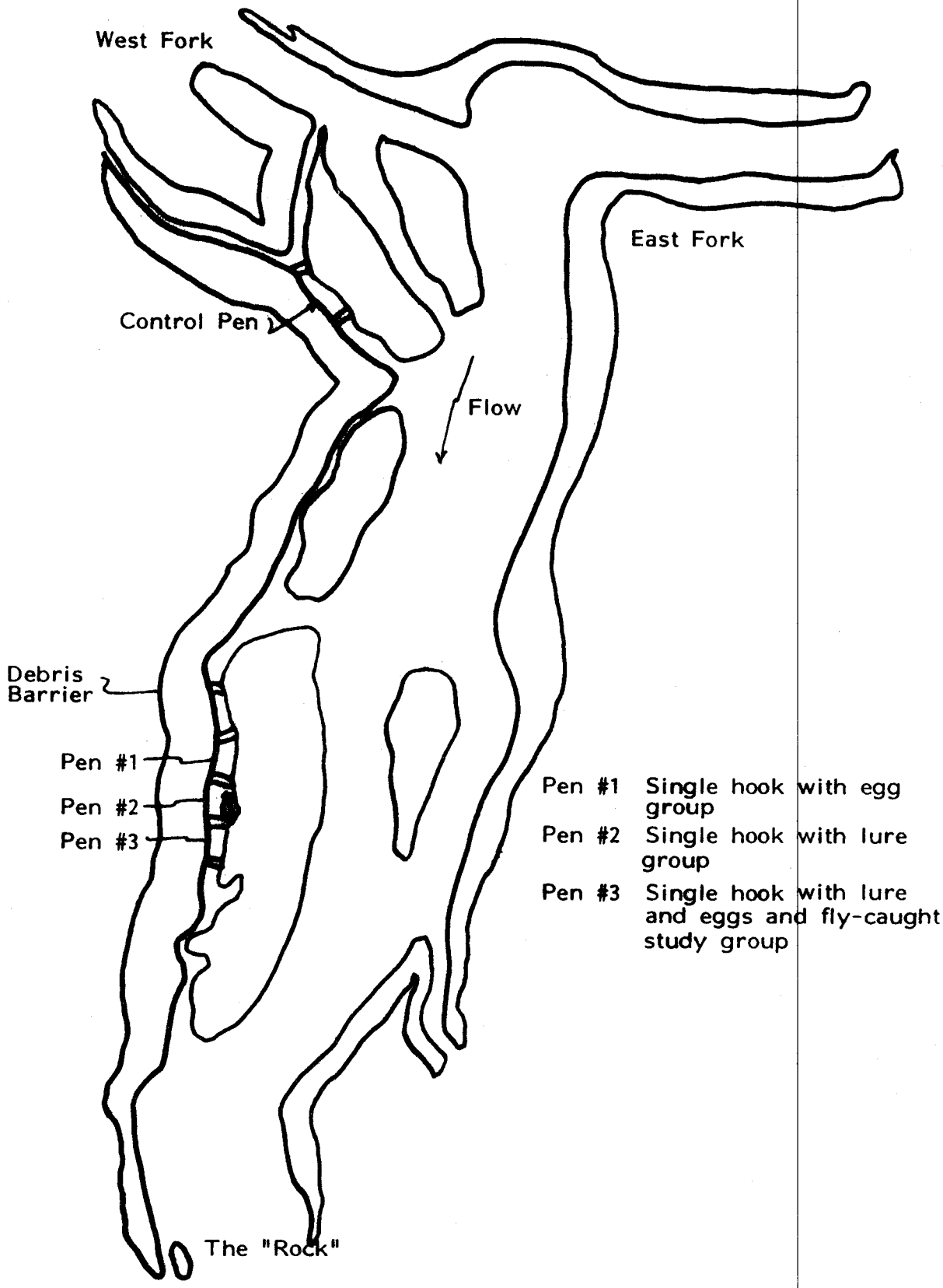


FIGURE 3 TROPHY RAINBOW TROUT HOOKING MORTALITY HOLDING AND STUDY PENS AT LOWER TALARIK CREEK, 1971.

Accurate notes recording all mortalities, aberrant behavior, infections, etc., were maintained. Autopsies were conducted on all mortalities to ascertain probable cause of death.

A control group of 40-50 rainbow trout were "herded" into the control pen by using an electroshocking unit, thus precluding a loss due to hooking or handling. These fish were held 10 days to observe natural mortality due to the incidence of disease, fungus, or infections. This study group was terminated early due to ice conditions.

The study fish were tagged and released after the 14-day observation period. Prior to release, length, sex data, and scales were taken.

Results of the 1971 hooking mortality study are shown in Table 6. In all study groups except the control group, a fungus infected approximately 60% of the rainbow trout. The control group had one infected rainbow trout and was the only recorded mortality. The fungal sporangia are present in the water of Lower Talarik Creek throughout the year, but are more prevalent and infectious as the water temperature increases during the red salmon, Oncorhynchus nerka, "die-off" period (late August to mid-September). The fungus was found in hook and wound areas or on the eyes and fins, causing blindness and sloughing of the fins. Death resulted in more advanced cases. The fungus may have had an adverse influence on the hooking mortality study as a result of handling.

Hook and line sampling indicated that more hooking mortalities occurred in the first 24 hours and in deep and fast water areas. Angler attitudes, attentiveness, and abilities also enter into any hooking mortality study. Mortalities in excess of 20% occurred when using single hooks baited with salmon eggs. There were no mortalities using artificial flies.

The scarcity of rainbow trout during early fall limited the number of rainbow trout captured.

As a result of the hooking mortality studies conducted during 1970 (Siedelman, 1971) and 1971, which indicated increased mortalities from the use of eggs, a restriction was placed on their use in Lower Talarik Creek, and Gibraltar, and Copper rivers from June 7 to October 31. This restriction is intended to reduce angler-induced mortalities in these systems' hook-and-release fisheries.

Catch and Effort:

Catch and effort data were collected from June 16 to October 17, at Lower Talarik Creek. An estimated 587 fishermen were observed fishing during this 126-day period, with the peak fishing pressure occurring during September. Staff personnel checked 70.5% (414) of these fishermen to determine fishing effort, catch-and-release ratios, and total man-hours fished.

TABLE 6 Results of Rainbow Trout Hooking Mortality Study by Terminal Gear, Lower Talarik Creek, 1971.

Time Period	Rainbow Trout Mortality by Type of Gear				Control Group
	Single Hook With Lure	Single Hook With Eggs	Single Hook Lure With Eggs	Flies	
Start (No. Captured)	+26	+33	+32	+9	40-50
1 Hour	0	- 3	0	0	0
8 Hours	0	- 1	0	0	0
24 Hours	0	0	0	0	0
48 Hours	0	- 1	0	0	0
3-14 Days	- 4	- 2	- 2	0	1
Finish (No. Surviving)	+22	+26	+30	+9	*
% Mortality	15.4	21.2	6.3	0.0	

*Terminated on the 10th day due to ice conditions.

A total of 2,314 man-hours were expended to catch 2,045 rainbow trout. Three hundred eighty-eight (19.0%) rainbow trout were retained and the remainder released. Seasonal catch per unit of effort was 0.88 rainbow trout per hour. Comparative creel census data collected from August 26, 1970 through October 11, 1971, is shown in Table 7.

TABLE 7 Rainbow Trout Creel Census Data Collected from August 26 to October 11, Lower Talarik Creek, 1970-1971.

Year	Fishermen Observed	Fishermen Checked	Hrs.	RT Catch	Catch/ Angler Hr.	RT Retained
1970	302	244 (80.8%)	1,315.5	600	0.46	119 (19.8%)
1971	267	223 (83.5%)	1,117.0	1,055	0.94	174 (16.5%)

Of the 2,045 rainbow trout caught, 321 (15.7%) were sampled for age and length analysis. There were 106 (33.0%) rainbow trout over 508 mm and 215 (67.0%) under 508 mm. The majority of rainbow trout caught from mid-June through September were under 508 mm. In October, 87.5% of the catch measured over 508 mm (Table 8).

The larger fish were not observed in Lower Talarik Creek until September 8, and were available to the angler throughout October until freeze-up. The larger rainbow trout normally start entering this creek during late August and early September. A greater number of small rainbow trout (less than 508 mm) were noted in this creek through late August than were noted during 1970.

Economic Evaluation of the Sport Fishery:

From June 14 to October 17 Department personnel conducted an economic evaluation of the Lower Talarik Creek sport fishery.

Anglers arriving at Lower Talarik Creek were solicited for information pertaining to monetary expenditures. Anglers were queried as to place of residence, transportation to and from Lower Talarik Creek, type and location of lodging utilized, length of stay, professional services used, and miscellaneous expenses. All expenses incurred travelling to and from Lower Talarik Creek were considered applicable, even though the primary purpose of each fisherman's trip may not have been to fish Lower Talarik Creek. Angler residence was noted to determine resident and non-resident economic impact.

TABLE 8 Rainbow Trout Sampled by Month and Size from Angler Catch and Bag Data, Lower Talarik Creek, 1971.

Month	Catch	No. RT Measured	No. RT Over 508 mm	No. RT Under 508 mm	% RT Measured Over 508 mm	% RT Measured Under 508 mm
June 15 - 30	666	102	22	80	21.6	78.4
July	306	43	4	39	9.3	90.7
August	141	43	10	33	23.3	76.7
September	834	93	35	58	37.6	62.4
October 1 - 17	98	40	35	5	87.5	12.5
Totals	2,045	321	106	215	33.0	67.0

Commercial airlines were utilized by all anglers for travel into and/or in-state travel to the Bristol Bay area. Air charter and private aircraft were used to travel to and from Lower Talarik Creek in all cases. The type of aircraft, pilot and/or owner, and origin of the flight were noted. Air charter service pilots were interviewed to ascertain charter fees and hourly rates. Flight times by each aircraft type were computed with hourly charter fees to determine average cost per flight from point of origin to Lower Talarik Creek and return. Further information and fares for air charter services were obtained by interviews or by mail. Commercial airline fares were obtained from the Official Airline Guide (November, 1971).

Anglers visiting Lower Talarik Creek utilized several of the available lodging options, i.e., tents, lodges, private cabins, and homes. Lodging rates were obtained directly from lodge owners.

If a number of individuals chartered an aircraft, the charter fees were assumed to be split equally among party members.

Guides and guided parties were personally interviewed to determine guide and party fees. Miscellaneous expenses included food and beverages used while camping at Lower Talarik Creek. Taxidermy fees, fishing equipment, licenses, and food and lodging costs while in metropolitan areas were also considered in the economic evaluation.

Presentation and expansions of data are as follows:

	No. Anglers Censused	No. Angler Days Fished	Avg. Angler Days Fished	Tot. Expenditures	Cost/ Angler-Day
Resident	164	235	1.43	$13,181.00	$ 56.09
Nonresident	137	216	1.58	83,439.00	386.29
Total	301	451	1.50	$96,620.00	$214.24

Average Expenditures/Trip To Lower Talarik Creek:

Resident	$ 80.37
Nonresident	$609.04
Combined	$321.00

451 angler days checked represents 76.8% of 587 days observed: therefore:

$$\frac{\text{451 angler days}}{\text{587 observed angler days}} = \frac{\text{\$96,620.00 spent}}{X}$$

therefore: X = $125,755.96 expended during 587 angler days at Lower Talarik Creek

$125,755.96 was the estimate of monies expended to fish at Lower Talarik Creek during the 126-day period.

therefore: $\frac{\$125,755.96}{126} = \$998.06$ was spent per day by all fishermen to fish Lower Talarik Creek

A total of 2,045 rainbow trout were caught during the 126-day study period by 493 creel checked anglers; expanded to 587 total angler days observed, a total estimate of 2,434 rainbow trout were caught.

Cost per rainbow trout caught = $\frac{\text{total expenditures}}{\text{number of rainbow trout caught}}$

Cost per rainbow trout:

	No.	Cost
Retained	462	$272.20
Caught	2,434	51.67

Breakdown of angler place of residence:

	Area	No.	
Resident:	Anchorage	145	
	Kenai-Soldotna	14	
	Lake Iliamna Area	2	
	Fairbanks	2	
	Other Areas of Alaska	1	
	Total Resident Anglers		164
Nonresident:	Far West	51	
	Rocky Mountains	20	
	Midwest	43	
	South	9	
	Northeast	13	
	Foreign Countries	1	
	Total Nonresident Anglers		137
	Total Anglers-Lower Talarik Creek, 1971		301

Angler Expense Categories:

Commercial airlines, in-state	$ 6,198.00
Commercial airlines, out-of-state	46,212.00
Air charter services	7,760.00
Private air travel	11,898.00
Local lodging and guide service	17,934.00
Miscellaneous (includes Anchorage meals, lodging, licenses, taxidermy services, fishing and camping equipment, food and drink)	6,618.00
Total expenses incurred by 301 anglers surveyed at Lower Talarik Creek in 1971	$96,620.00

Juvenile Rainbow Trout Sampling

Electroshock sampling was conducted on the west fork of Lower Talarik Creek to collect juvenile rainbow trout. Two hundred ten juvenile rainbow trout were collected for growth and age determination. The length frequency by age class is presented in Table 9. Circuli and annuli counts were made from scale smears taken from juvenile rainbow trout to determine location of the first, second, and third annulus. The average number of circuli of the first, second, and third annulus were 7, 6, and 6 respectively. This information will aid in future age determinations of rainbow trout taken at Lower Talarik Creek. Sex was determined and a female-male sex ratio of 1:1 was indicated.

TABLE 9 Length Frequency of Juvenile Rainbow Trout by Age Class, Lower Talarik Creek, 1971.

Length (mm)	Age Class 0	I	II	III	IV	Tot.
0 - 9	-	-	-	-	-	-
10 - 19	-	-	-	-	-	-
20 - 29	-	-	-	-	-	-
30 - 39	70	-	-	-	-	70
40 - 49	36	-	-	-	-	36
50 - 59	21	-	-	-	-	21
60 - 69	2	-	-	-	-	2
70 - 79	-	12	-	-	-	12
80 - 89	-	3	-	-	-	3
90 - 99	-	4	-	-	-	4
100 - 109	-	3	4	-	-	7
110 - 119	-	3	6	-	-	9
120 - 129	-	1	10	1	-	12
130 - 139	-	-	7	-	-	7
140 - 149	-	-	3	4	-	7
150 - 159	-	-	1	3	-	4
160 - 169	-	-	2	4	-	6
170 - 179	-	-	1	1	-	2
180 - 189	-	-	1	2	-	3
190 - 199	-	-	-	1	1	2
200 - 209	-	-	-	2	-	2
210 - 219	-	-	-	1	-	1
220 - 229	-	-	-	-	-	-
Total	129	26	35	19	1	210
Length Range (mm)	31-64	70-127	101-187	128-216	197	31-216
Avg. Length (mm)	41	67	130	168	197	71
Growth Increment (mm)	26	63	38	29		

Age and Growth:

Rainbow trout samples were collected for age and growth relationship from angler's creel census, Department's hooking mortality study, and tagging program. The length frequency of 406 samples is shown in Figure 4.

Of the 406 rainbow trout samples collected for age-growth relationship at Lower Talarik Creek, 380 scales were legible for age determination. Ages IV to VII comprised 83.2% of the total sample (Table 10).

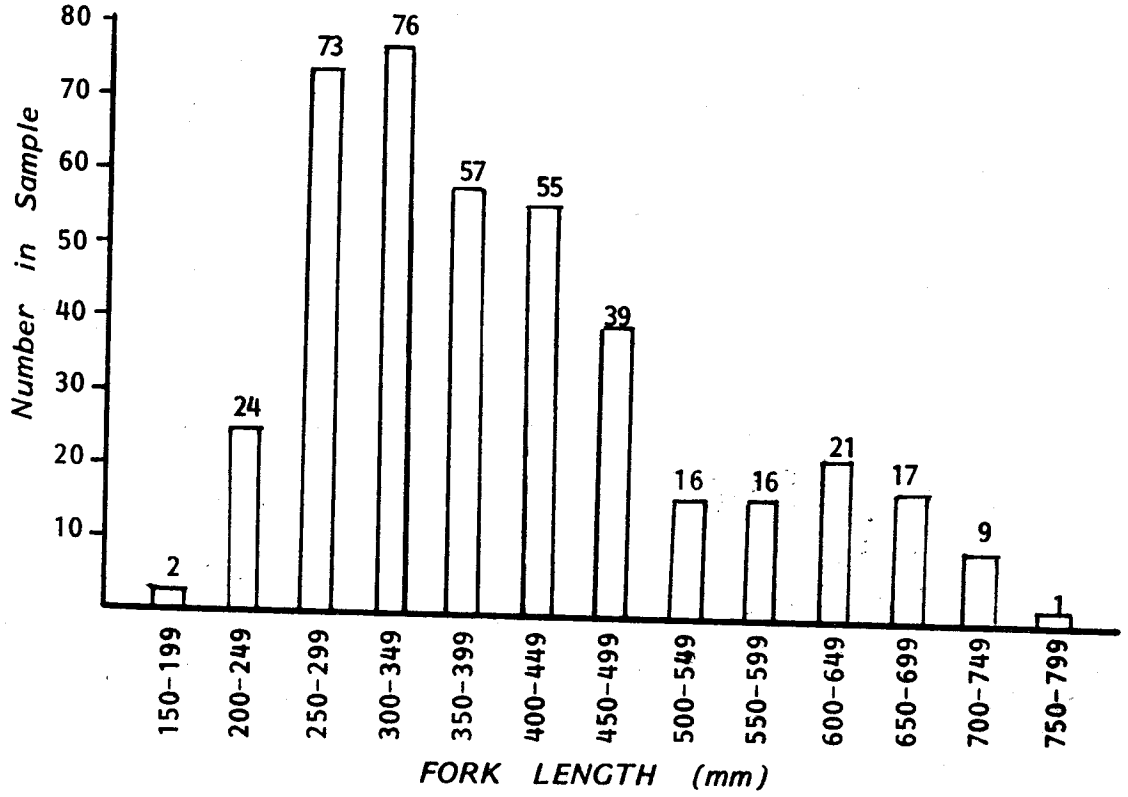


FIGURE 4 LENGTH FREQUENCY OF SPORT-CAUGHT RAINBOW TROUT, LOWER TALARIK CREEK, 1971.

TABLE 10 Length-Age Frequency of Sport-Caught Rainbow Trout, Lower Talarik Creek, 1971.

Length (mm)	Age Class III	IV	V	VI	VII	VIII	IX	X	XI	Tot.
175 - 199	1	1	-	-	-	-	-	-	-	2
200 - 224	-	4	-	-	-	-	-	-	-	4
225 - 249	-	18	1	-	-	-	-	-	-	19
250 - 274	-	20	8	-	-	-	-	-	-	28
275 - 299	-	8	30	5	-	-	-	-	-	43
300 - 324	-	9	16	11	-	-	-	-	-	36
325 - 349	-	1	16	18	2	-	-	-	-	37
350 - 374	-	-	4	12	11	-	-	-	-	27
375 - 399	-	-	-	14	13	-	-	-	-	27
400 - 424	-	-	-	7	15	-	-	-	-	22
425 - 449	-	-	-	17	13	-	-	-	-	30
450 - 474	-	-	-	11	14	1	-	-	-	26
475 - 499	-	-	-	1	8	1	-	-	-	10
500 - 524	-	-	-	-	3	4	-	-	-	7
525 - 549	-	-	-	-	2	4	1	-	-	7
550 - 574	-	-	-	-	2	5	1	-	-	8
575 - 599	-	-	-	-	-	2	4	-	-	6
600 - 624	-	-	-	-	-	6	4	-	-	10
625 - 649	-	-	-	-	-	6	2	2	-	10
650 - 674	-	-	-	-	1	2	4	2	-	9
675 - 699	-	-	-	-	-	3	2	-	-	5
700 - 724	-	-	-	-	-	1	3	-	-	4
725 - 749	-	-	-	-	-	1	-	1	-	2
750 - 774	-	-	-	-	-	-	-	-	1	1
Total	1	61	75	96	84	36	21	5	1	380
Length Range (mm)	185 -	194 - 337	249 - 365	277 - 490	337 - 667	466 - 735	541 - 717	625 - 731	767 -	185 - 767
Avg. Length (mm)	185	263	301	381	432	596	636	663	767	396
Growth Increment		78	38	80	51	164	40	27	104	

When comparing age-length of Lower Talarik Creek rainbow trout by time period, seasonal variations are apparent in the age and size distribution (Table 11). Samples collected early in the season (June 16 - July 4) indicated older age classes consisting of 24.3% post-spawners.

TABLE II Age-Length Comparison by Time Period of Sport-Caught Rainbow Trout, Lower Talarik Creek, 1971.

Time Period	Age Classes	No. in Sample	Length (mm) Range	Length (mm) Avg.	Growth Increment (mm)
6/16 - 7/ 4	III	-	-	-	
	IV	-	-	-	
	V	4	251 - 298	272	
	VI	22	277 - 391	322	50
	VII	67	337 - 503	413	91
	VIII	5	466 - 546	510	97
	IX	15	541 - 717	638	128
	X	3	625 - 751	676	38
	XI	1	767	767	91
	Total	117	251 - 767	434	
7/ 6 - 9/ 9	III	1	185	185	
	IV	59	194 - 337	263	78
	V	58	249 - 358	299	36
	VI	67	304 - 490	402	103
	VII	14	431 - 560	493	91
	VIII	8	520 - 648	584	91
	IX	1	577	577	-7
	X	-	-	-	
	XI	-	-	-	
	Total	208	185 - 648	347	
9/15 - 10/17	III	-	-	-	
	IV	2	254 - 258	256	
	V	13	270 - 365	318	62
	VI	7	313 - 435	373	55
	VII	3	510 - 667	569	196
	VIII	23	505 - 735	597	28
	IX	5	593 - 680	641	44
	X	2	628 - 662	645	4
	XI	-	-	-	
	Total	55	254 - 735	494	
6/16 - 10/17	III	1	185	185	
	IV	61	194 - 337	263	78
	V	75	249 - 365	301	38
	VI	96	277 - 490	381	80
	VII	84	337 - 667	432	51
	VIII	36	466 - 735	596	164
	IX	21	541 - 717	636	40
	X	5	625 - 751	663	27
	XI	1	767	767	104
	Total	380	185 - 767	396	

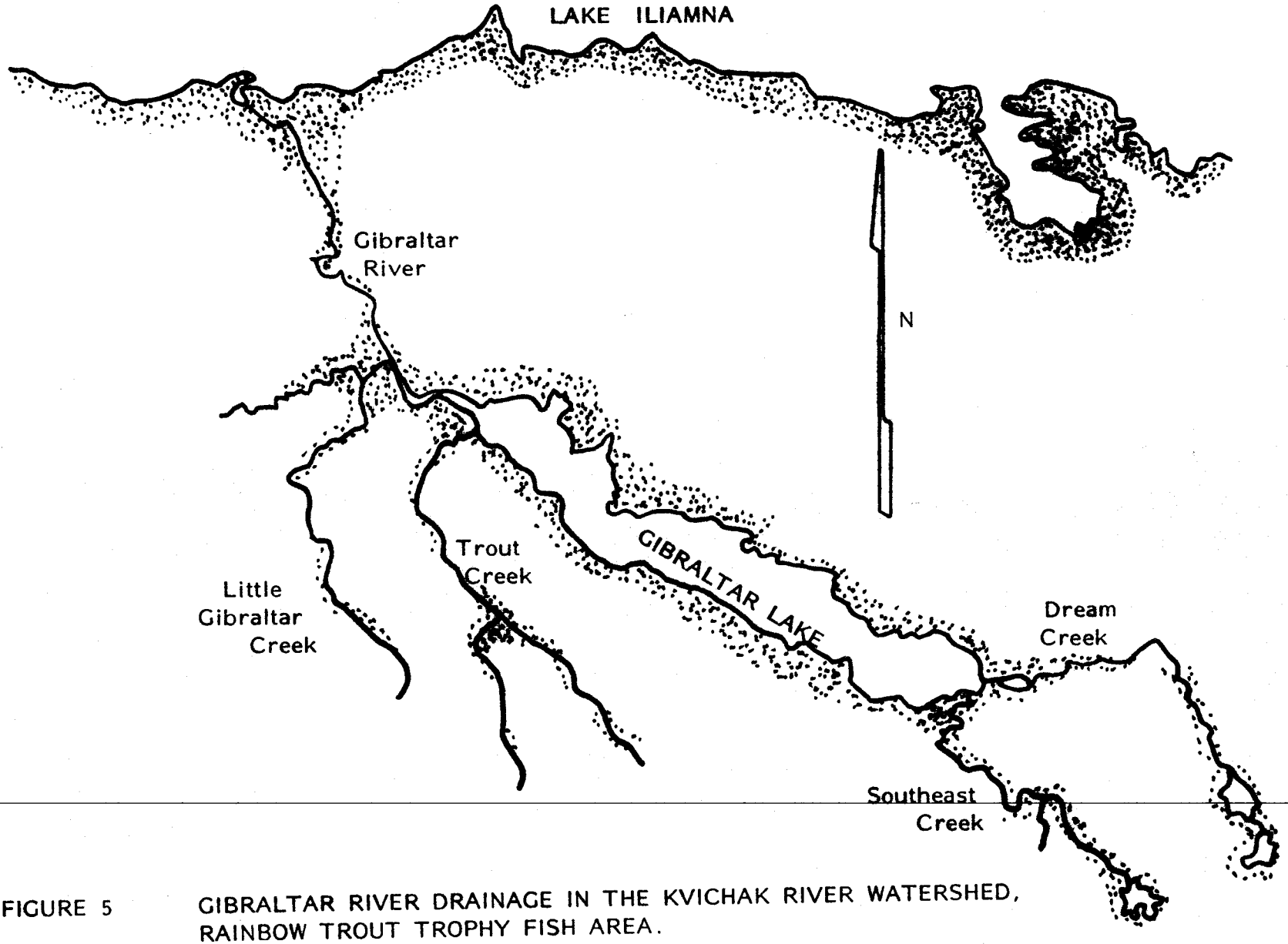


FIGURE 5 GIBRALTAR RIVER DRAINAGE IN THE KVICHAK RIVER WATERSHED, RAINBOW TROUT TROPHY FISH AREA.

Rainbow trout captured from July 6 to September 9 were younger and smaller than fish in the June 16 to July 4, and September 15 to October 17 periods. Ages IV to VI comprised 88.5% of this period's catch (Table 11).

Larger rainbow trout migrated into Lower Talarik Creek during the September 15 to October 17 period. Average length for this sample was 494 mm which was 147 mm larger than the previous period and 60 mm larger than the June 16 to July 4 period (Table 11).

Gilbraltar River Drainage

The rainbow trout trophy fish drainage of Gibraltar River was surveyed from September 30 through October 5. Samples were collected from Dream Creek, Southeast Creek, and Gibraltar River. No fish were sampled in Little Gibraltar Creek which was surveyed to the forks (Figure 5).

Eighty-two rainbow trout were sampled and 72 were tagged during this survey. One fish previously tagged during 1969 was recovered. The sample ranged from 302 - 614 mm. Twenty percent of the total sample was over 508 mm in length. Sixty-eight scales were legible for age determination. The age-length frequency for 68 rainbow trout is shown in Table 12.

TABLE 12 Age-Length Frequency of Sport-Caught Rainbow Trout, Gibraltar River System, 1971.

Age	No. in Sample	Length (mm) Range	Avg.
IV	18 (26.5%)	320 - 439	367
V	22 (32.3%)	377 - 502	441
VI	24 (35.3%)	388 - 557	502
VII	4 (5.9%)	506 - 551	537
Totals	68 (100.0%)	320 - 557	449

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